IN THE CLAIMS

For the convenience of the Examiner, all pending claims of the present Application are presented below. Claims 1 and 12 have been amended solely for formatting reasons. No substantive claim amendments have been made.

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1. **(Currently Amended)** A computerized method of virtual flowbench simulation of fluid flow interaction with an object described in at least one design file, comprising:

~~Receiving~~ **receiving** user-defined input via a user interface, the user-defined input including a specification of the at least one design file;

accessing the at least one design file;

accessing a generic template describing basic geometries of the object, and modifying the basic geometries of the object with the at least one design file;

automatically generating surface and volume mesh in the object;

automatically simulating fluid flow interaction with the object and measuring and storing predetermined data parameters;

automatically checking the predetermined data parameter measurements to determine whether steady state has been reached and whether a predetermined maximum number of time steps has been reached;

automatically terminating simulation in response to one of steady state being reached and the predetermined maximum number of time steps being reached; and

generating an output of predetermined data parameter measurements.

2. **(Original)** The method, as set forth in claim 1, wherein accessing the at least one design file comprises accessing a solid model of a valve design.

3. **(Original)** The method, as set forth in claim 2, wherein receiving user-defined input further comprises receiving a selection of engine cylinder head valve study.

4. **(Original)** The method, as set forth in claim 2, wherein accessing a generic template comprises accessing basic geometries of a cylinder head, and modifying the basic geometries of the cylinder head with the solid model of the valve design.

5. **(Original)** The method, as set forth in claim 2, wherein receiving user-defined input comprises receiving a number of valves in the cylinder head.

6. **(Original)** The method, as set forth in claim 2, wherein receiving user-defined input comprises receiving a selection of intake or exhaust valve.

7. **(Original)** The method, as set forth in claim 2, wherein receiving user-defined input comprises receiving an indication of which of the intake or exhaust valve moved during simulation.

8. **(Original)** The method, as set forth in claim 1, wherein receiving user input further comprises receiving a selection of engine cylinder head port study.

9. **(Original)** The method, as set forth in claim 1, wherein receiving user input further comprises receiving simulation parameters.

10. **(Original)** The method, as set forth in claim 1, wherein accessing a generic template comprises accessing basic geometries of a cylinder head with geometries of an inlet, a port, and at least one intake valve and one exhaust valve.

11. **(Original)** The method, as set forth in claim 1, wherein accessing a generic template comprises accessing a definition of a data measurement region, simulation parameters, and mesh region scaling and resolution.

12. **(Currently Amended)** A computerized method of virtual flowbench simulation of fluid flow interaction with a part in a cylinder head described in at least one design file, comprising:

~~Receiving~~ **receiving** user-defined input via a graphical user interface, the user-defined input including a specification of the at least one design file;

accessing the at least one design file;

accessing a generic template describing basic geometries of the cylinder head, and modifying the basic geometries of the cylinder head with the part defined in the at least one design file;

automatically generating surface and volume mesh in the modified cylinder head geometry;

automatically simulating fluid flow interaction with the modified cylinder head and measuring and storing a mass flow data through inlet, port and outlet and around a valve displaced a predetermined distance from the inlet;

automatically checking the mass flow data to determine whether steady state has been reached and whether a predetermined maximum number of time steps has been reached;

automatically terminating simulation in response to one of steady state being reached and the predetermined maximum number of time steps being reached; and

generating an output.

13. **(Original)** The method, as set forth in claim 12, wherein receiving user input further comprises receiving an indication of whether a valve design or a port design is being simulated.

14. **(Original)** The method, as set forth in claim 12, wherein accessing the at least one design file comprises accessing a solid model of a valve design and receiving user input further comprises receiving a selection of engine cylinder head valve study.

15. **(Original)** The method, as set forth in claim 14, wherein accessing a generic template comprises accessing basic geometries of a cylinder head, and modifying the basic geometries of the cylinder head with the solid model of the valve design.

16. **(Original)** The method, as set forth in claim 14, wherein receiving user-defined input comprises receiving a number of valves in the cylinder head and a selection of intake or exhaust valve.

17. **(Original)** The method, as set forth in claim 12, wherein receiving user input further comprises receiving a selection of engine cylinder head port study.

18. **(Original)** The method, as set forth in claim 12, wherein accessing a generic template comprises accessing basic geometries of a cylinder head with geometries of an inlet, a port, and at least one intake valve and one exhaust valve.

19. **(Original)** The method, as set forth in claim 12, wherein accessing a generic template comprises accessing a definition of a data measurement region, simulation parameters, and mesh region scaling and resolution.

20. **(Original)** The method, as set forth in claim 12, further comprising notifying a user of simulation progress via electronic mail during simulation.

21. **(Original)** The method, as set forth in claim 12, wherein generating the output comprises generating a movie showing fluid flow in the cylinder head and through the port, inlet and outlet, and around the valve.

22. **(Original)** The method, as set forth in claim 12, wherein generating the output comprises generating a graphical plot of the mass flow data measured during simulation.

23. **(Original)** A virtual flowbench simulation system of a part described in a design file, the part being a portion of a component, comprising:

a graphical user interface operable to receive user-defined input specifying the design file, the type of part to be simulated, and other simulation parameters;

a generic template describing basic geometries and boundary conditions of the component;

an autogridding process operable to automatically generating surface and volume meshes in the component with the part described in the user-specified design file;

a computational fluid dynamic simulation process operable to automatically simulate fluid flow in and around the component and measuring data;

a controller operable to monitor the computational fluid dynamic simulation process and issue simulation progress reports, the controller further operable to terminate the simulation process when a steady state in measured data is reached or when a predetermined maximum time step is reached; and

a measurement data output process operable to format and output the measured data in a user-specified representation.

24. **(Original)** The system, as set forth in claim 23, wherein the generic template describes the basic geometries of a cylinder head having a predetermined number of intake valves, a predetermined number of exhaust valves, port configuration, and inlet and outlet.